

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN FRANCISCO BAY REGION

SITE CLEANUP REQUIREMENTS ORDER NO. 94-043

AMENDMENT OF SITE CLEANUP ORDER NOS. 91-020, 92-132 AND 93-018, FOR:

FMC CORPORATION AND  
FEDERAL PACIFIC ELECTRIC COMPANY

333 WEST BROKAW ROAD  
SANTA CLARA  
SANTA CLARA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter called the Board) finds that:

Site Description and Site History

1. FMC Corporation (FMC) presently owns and occupies a 27 acre property at 333 West Brokaw Road, Santa Clara, Santa Clara County (hereinafter referred to as the Site) as shown in attached Figures 1 and 2.
2. Federal Pacific Electric Company (FPE) owned and operated a portion of the Site from 1954 to 1964. FPE then sold its portion of the Site to FMC in 1964. FPE leased a portion of the Site from FMC until 1968, after which FMC occupied the entire former FPE portion of the Site.

Regulatory Status

3. On February 20, 1991, the Board adopted Site Cleanup Requirements (SCR) Order No. 91-020, which named FMC as a discharger and required site characterization, evaluation of alternative remedial actions, proposal of final cleanup standards, and implementation of final cleanup actions approved by the Board.
4. On October 21, 1992, the Board adopted SCR Order No. 92-132, which amended SCR Order No. 91-020. This Order added cleanup standards, concurred with FMC's proposed remedial actions for soil and groundwater and adopted findings that added FPE as a discharger. Provision A.1. of SCR Order No. 92-132 allowed either discharger to propose alternate cleanup levels if the specified levels could not be reasonably achieved. On November 19, 1992, pursuant to Section 13321 of the California Water Code, FPE filed a petition for review of SCR Order No. 92-132 with the State Water Resources Control Board. In its petition, FPE also requested a stay of SCR Order No. 92-132 and an evidentiary hearing.
5. On February 17, 1993, the Board adopted SCR Order No. 93-018, which amended SCR Order Nos. 91-020 and 92-132, addressing some of the issues raised in FPE's appeal, and added a provision to submit a "Supplemental Evaluation of Remedial Alternatives", including, if appropriate, proposal of "alternative remedial actions and final cleanup levels for onsite

pollution". In March 1993, both FMC and FPE filed petitions for review of SCR Order 93-018 with the State Water Resources Control Board. Both petitions are currently in abeyance.

6. Except as expressly provided in this Order, the SCR Order Nos. 91-020, 92-132 and 93-018 are not amended, including in particular, Findings 7 through 16 of SCR Order No. 93-018 related to the determinations of the responsibilities of FMC and FPE as dischargers. This Order amending Orders 91-020, 92-132 and 93-018, amends previous requirements for soil and groundwater at Operating Unit 2 (OU-2), as well as TPH (mineral oil) cleanup requirements for areas of soil contamination at the Site.
7. On April 23, 1993, FPE and FMC hereinafter referred to as dischargers submitted to the Board the "Supplemental Evaluation of Alternative Remediation Goals and Remedial Actions" (hereinafter the "Supplemental Evaluation"), which proposed certain revisions to soil cleanup levels.
8. On February 9, 1994, the dischargers submitted to the Board an Addendum to the Supplemental Evaluation, Alternative Remediation Goals and Remedial Actions (Addendum to Supplemental Evaluation), which proposed certain revisions to soil cleanup levels for TPH (mineral oil).
9. The documents listed below, previously submitted to the Board by FMC, formed the technical basis for selection of the cleanup levels and proposed remedial actions adopted in SCR Order No. 92-132. These documents were also the primary data sources used in the Supplemental Evaluation and the Addendum to Supplemental Evaluation:

Remedial Investigation Report, Volumes I, II, III, IV, and V, dated April 1991 (RI).

Addendum to Remedial Investigation Report, dated July 1991 (RI Addendum).

Remedial Alternatives Report, dated August 1991 (RAR).

Evaluation of Soil and Groundwater Cleanup Levels, dated June 1992.

10. In June 1992, the California Department of Toxic Substance Control (DTSC) issued a RCRA Facility Assessment (RFA) for FMC's San Jose and Santa Clara facilities, including the Site. This RFA identified some eight solid waste management units (SWMUs) at the Site, some of which were described as potentially requiring further investigation. The investigation reported in the documents listed under Finding 9, above, has included the areas of the Site where these SWMUs are located.

#### Risk Assessment for VOC Contaminated Soil and Groundwater in OU-2

11. The Supplemental Evaluation for VOCs is based on the premise that lower levels of VOC in soil exist at Area II with a localized area where the levels are higher. The previous risk assessment model set forth in the Evaluation of Soil and Groundwater Cleanup Levels (June 1992), assumed an average TCE concentration for the whole of Area II of 1 mg/kg.

- a. The dischargers' fate and transport modeling, and risk analyses indicated that 1.2 mg/kg total VOCs, modeled as TCE uniformly distributed throughout the defined source area, would not represent a significant cancer health risk, assuming exposure to groundwater at a compliance point located half the distance to the property border from the defined source area. The risk analyses includes calculations of a hazard index (HI) for VOCs that was less than one. The analysis was for exposure via drinking and showering with the subject groundwater.
  - b. The dischargers' Supplemental Evaluation demonstrated that the concentrations of VOCs that more accurately represent measured values in the Site soils also do not represent a significant health risk in groundwater at the compliance point. A smaller area of elevated concentrations in conjunction with average chemical flux entering groundwater from the remaining source area was used in the modeling.
  - c. Three EPA approved models were used to predict VOC concentrations in groundwater. Based on EPA-approved risk characterization guidance, including consumption of 1.4 liters/day of groundwater and on-site presence of 350 days/year, the significant cancer health risk threshold of less than  $10^{-5}$  would not be reached in Area II for VOCs.
  - d. At TCE concentrations of 5 mg/kg for residential use and 10 mg/kg for commercial land use, risk analysis show that for residents living at the Site or workers in an industrial setting these concentrations would not represent a significant carcinogenic health risk. Similarly, the health risk associated with the highest detected residual concentration of non-carcinogenic chemicals, 1,1,1-Trichloroethane at 17 mg/kg at 15 feet below grade, would not exceed a HI of one.
12. The risks relating to the remaining VOCs in soil and groundwater can be managed by implementing deed restrictions, a long-term monitoring program and a contingency plan. The contingency plan would be implemented if monitoring indicates that additional remediation is necessary.

#### Risk Assessment for TPH (mineral oil) Contaminated Soil

13. TPH cleanup levels can be modified because of a new health risk assessment in the Addendum to Supplemental Evaluation. Risk assessment for TPH (mineral oil) is based on a better understanding of the type of pollutants that actually exist at the Site.
- a. A review of available gas chromatograms from laboratory analyses by EPA Method 8015M of soil samples from Areas II, III, IV, V and VI indicates that the detected petroleum hydrocarbons are predominantly high molecular weight compounds (mineral oil). These chromatograms were typically analyzed and reported as motor oil by the analytical laboratories. The chromatograms reveal a general absence of lower molecular weight hydrocarbon compounds; nor is there an abundance of individual n-alkane peaks characteristic of fuel hydrocarbons such as gasoline or diesel. A soil boring sample at the western edge of Area II near the Santa Clara Substation, and in a soil boring at Area V did show lower molecular weight hydrocarbons more characteristic of mid-range distillates.

- b. Transformer oils and lubricating oils are composed largely of C14 and higher hydrocarbon compounds. The mineral oils of the type believed to have been used at the Site have a C18 average carbon number. These oils are produced from naphthenic distillates that are severely hydrotreated or severely solvent extracted producing an oil that OSHA considers exempt from carrying a carcinogenic warning. The oils consist primarily of isoparaffins and cycloparaffins. Hydrotreating and solvent extraction removes aromatics compounds that cause sludges, acids or aldehydes. Removal of the aromatic fraction in the oil also results in lower health risk potential.
- c. The dischargers' Supplemental Evaluation demonstrates naphthenic petroleum hydrocarbons in on-site soils do not pose a threat to groundwater quality. Direct contact with on-site soils containing refined naphthenic oils constitutes minimal risk to public health because of the non-carcinogenic, low toxicity of the oil. Constituent isoparaffins and cycloparaffins are not regulated as carcinogenic materials and generally have very high acute dosages.
- d. The dischargers' Addendum to Supplemental Evaluation state that toxicologists at Chevron and Exxon, oil companies that have produced transformer insulating oils, remarked that the acute oral toxicity for rats is extremely low, the LD50 is greater than 5000 mg/Kg of body weight. Toxicity information were searched on the National Library of Medicine's Toxicology Data Network database. The Hazardous Substances Data Bank contained citations for generic "mineral oils" (saturated alkanes C14 to C18 and cycloalkanes). The toxic hazard rating for mineral oil is "practically non-toxic: probable oral lethal dose (human) above 15 g/kg, more than 1 quart for a 70 kg person".
- e. The recently issued Preliminary Endangerment Assessment Guidance Manual (California EPA, Department of Toxic Substances Control, 16 December 1993) used default parameters of a residential neighborhood, 100 percent bioavailability of ingested chemical and a soil ingestion rate of 200 mg/day for 350 days per year for 6 years. The Addendum to Supplemental Evaluation proposed that constituents such as naphthalene are likely to be present at less than one percent in highly refined, hydrotreated naphthenic oils. However conservatively assuming that naphthalene constituents are up to 15 percent of TPH (mineral oil) found in soil at the Site and a concentration of 8,000 mg/kg for TPH (mineral oil) in the soil, the childhood residential exposure for ingestion and dermal exposures to soil has a HI of less than one.

#### Soil Cleanup Levels

##### 14. Cleanup Levels for TPH (mineral oil).

The Board accepts and adopts the dischargers' proposal for final cleanup levels for TPH (mineral oil) in soil, as set forth in the Supplemental Evaluation and Addendum to Supplemental Evaluation, and finds these levels to be protective of human health and the environment, for the following reasons:

- a. Volatile aromatic compounds (e.g., BTEX) and PNAs are not constituents of the TPH (mineral oil) found in site soils;
- b. The characteristics of the suspected naphthenic hydrocarbons indicate low mobility and low toxicity;
- c. The TPH (mineral oil) cleanup level of 8,000 ppm is protective of groundwater quality; and
- d. The sporadic and often unverifiable occurrence of TPH (mineral oil) in Site soils further supports this revised soil cleanup level.

Based on the Supplemental Evaluation and the Addendum to Supplemental Evaluation, the soil cleanup level for non-asphaltic TPH (mineral oil) is therefore 8,000 ppm. The soils that exceed a TPH (mineral oil) level of 8,000 ppm or does not meet the criteria for mineral oil listed herein shall be based on a plan of remediation approved by the Executive Officer.

15. Cleanup Levels for VOCs.

SCR Order no. 92-132 required 1 ppm total VOC in soil with an option to for the dischargers to propose a higher cleanup level.

The Evaluation of Soil and Groundwater Cleanup Levels, submitted June 1992, demonstrated that 1.2 ppm total VOCs, modeled as TCE uniformly distributed throughout the source area, would not represent a significant carcinogenic health risk, assuming exposure to groundwater via drinking and showering at the compliance point. The risk analysis also concluded that the hazard index (HI) for non-carcinogenic VOCs is less than one. SCR Order 92-132 thereafter established a cleanup level for total VOCs in Site soil of 1 ppm.

The Supplemental Evaluation confirmed these conclusions through fate and transport modeling and a risk assessment concerning VOCs in soil and groundwater. This Evaluation demonstrated that actual concentrations of VOCs in Area II soils do not represent a significant health risk in groundwater, given a compliance point located midway between the Site border and the source area. Similarly, the risk analysis for direct exposure to VOC impacted Site soils for residential, industrial or commercial uses indicates that TCE concentrations of 10 ppm in Site soils would not represent a significant health risk. Further, the health risk associated with the highest detected residual concentration of non-carcinogenic chemicals, 1,1,1-trichloroethane at 17 ppm at 15 feet below grade, would not exceed a HI of one, and the cumulative Hazard Index for residual noncarcinogens was also less than one, and therefore would not pose a significant health risk.

In summary, the Supplemental Evaluation demonstrated that actual Site conditions represent less of a health risk than the previously established 1 ppm cleanup level and no change is therefore proposed to that cleanup level. As a result, neither excavation, above-ground remediation nor soil vapor extraction of VOCs is therefore now anticipated.

16. Groundwater Cleanup Level for VOCs

The dischargers' cleanup plan proposes on-site groundwater cleanup levels higher than California MCLs and utilizes the alternate points of compliance concept (i.e., compliance with low ppb VOC standards at on-site guard wells sufficient to protect beneficial uses while allowing limited, controlled areas of on-site groundwater which exceeds MCLs). Based upon information submitted by the dischargers, the compliance criteria outlined above, Board analysis of the Site and conditions, and the record before the Board, the Board finds that the application of alternate points of compliance is appropriate for groundwater operable unit 2 (OU-2). OU-1 requires remediation pursuant to SCR Order 91-164, for the adjacent 328 West Brokaw Road site, and is not considered for alternate points of compliance at this time.

17. SCR Order No. 91-020 specified that final cleanup levels for polluted groundwater shall be background water quality if feasible, but not greater than the California drinking water Action Level (AL) or MCL, whichever is more stringent. An AL does not apply if an MCL has been adopted for the pollutant. The Federal EPA similarly has adopted MCLs for certain chemicals, and the State and Federal MCLs are not always identical. The Federal EPA has also adopted MCL Goals (MCLGs) for certain chemicals, which may be lower than the Federal MCLs. The current Federal and State MCLs and MCLGs for VOCs of interest, and the appropriate MCL for this Site, are tabulated below, in Table 1.

Table 1: MCLs for VOCs of Interest (mg/l)			
Chemical	Federal MCL/MCLG	State MCL	Appropriate MCL
TCE	0.005/0.0	0.005	0.005
1,1-DCE	0.007/0.007	0.006	0.006
trans-1,2-DCE	0.100/0.100	0.010	0.010
cis-1,2-DCE	0.070/0.070	0.006	0.006
Vinyl chloride	0.002/0.0	0.0005	0.0005
1,1-DCA	--	0.005	0.005
1,1,1-TCA	0.200/0.200	0.200	0.200

18. With respect to VOCs in groundwater at this Site, the Board has reviewed all available information and has concluded that:
- While removal of VOCs in soil probably could be implemented, such action is not warranted because it would likely be insufficient to assure that MCLs or better for all VOCs in groundwater could be achieved at the Site in a timely and cost-effective manner.

- b. Risk analysis of existing conditions shows that direct exposure risks from VOCs in groundwater for residential, industrial or commercial uses at the Site are within acceptable limits. Groundwater cleanup levels less than MCLs are therefore unnecessary to protect public health and the environment, provided that on-site risk management plans are implemented to assure groundwater is not used for domestic purposes and adequate measures are taken to protect workers if excavation is proposed.
  - c. The dischargers should be able to contain the pollutant plume on-site and not allow off-site migration of VOCs above applicable MCLs.
  - d. The Board can insure protection of human health and water quality of the State by requiring the dischargers to prepare a Contingency Plan acceptable to the Executive Officer that identifies the appropriate location and number of guard and compliance wells, a self-monitoring program for chemicals of concern, activities required to initiate groundwater extraction and treatment, and appropriate criteria requiring initiation of the groundwater extraction program.
19. The Board has over 10 years of experience in the cleanup of polluted sites such as the FMC Site. In late 1992 with the consideration of Basin Plan groundwater amendments, the Board found that there are limits of existing technology. Recent research, much of which is being confirmed at sites within the Region, demonstrates that using pump and treat technology removes and controls pollutant mass migration. However, pump and treat technology is not adequate technology, in most situations, to meet low-concentration groundwater objectives because the costs and time-frames may be prohibitive and ineffective.
20. The Board establishes the overall cleanup level for a water body based upon the most sensitive beneficial use identified. In all cases, the Board first considers high quality or naturally occurring "background" concentration objectives as the cleanup levels for polluted groundwater with a beneficial use of municipal and domestic supply, such as at this Site. If background concentrations cannot be achieved, cleanup levels are normally set no higher than:
- Maximum Contaminant Levels (MCLs), or where MCLs have not been adopted, other valid technical data supporting maintenance of the beneficial use (i.e., adopted Secondary Maximum Contaminant Levels, etc.); or,
  - A more stringent level (i.e., below MCLs) based upon a Site specific risk assessment; or,
  - At a level lower than MCLs that is technically and economically feasible.
21. Groundwater cleanup levels are approved on a case-by-case basis by the Board. Proposed final cleanup levels are based on a discharger-developed feasibility study of cleanup alternatives that compares effectiveness, cost, time to achieve cleanup standards, and a risk assessment to determine impacts on beneficial uses, human health and the environment. Cleanup levels must also take into account the mobility, toxicity, and volume of pollutants. Feasibility studies of cleanup alternatives may include the guidance provided by Sub Part E of the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300); Section

25356.1(c) of the California Health and Safety Code; U.S. EPA's Comprehensive Environmental Response, Compensation, and Liability Act; the State Water Board's Resolutions Nos. 68-16 and 92-49; and the Regional Water Board's Resolution No. 88-160.

22. As a result of the Board's findings regarding limits of existing technology, the Board has indicated it may modify points of compliance and/or established ground water cleanup standards under certain conditions:
  - Adequate source removal and/or isolation is undertaken to limit future migration of chemicals to groundwater; *and*
  - Alternative or best available technologies are inappropriate or not cost-effective; *and*
  - An acceptable plan is submitted for containing and managing the remaining risks posed by residual groundwater pollution. This plan could include institutional controls (deed restrictions; site operation, maintenance, health and safety plans; utility workers notice, etc.) and a commitment to mitigating measures such as participation in a regional groundwater monitoring or protection program.
23. The Board will not enforce the MCLs at OU-2 if the VOCs are contained at the Site so that the pollutants do not migrate into the groundwater at the compliance wells above MCLs.
24. This action is an order to enforce the laws and regulations administered by the Board. This action is categorically exempt from the provisions of the CEQA pursuant to Section 15321 of the Resources Agency Regulations.
25. The Board has notified the dischargers and interested agencies and persons of its intent under California Water Code Section 13304 to prescribe Site Cleanup Requirements for the dischargers and has provided them with the opportunity for a public hearing and an opportunity to submit their written views and recommendations.
26. The Board in a public meeting heard and considered all comments pertaining to these requirements.

IT IS HEREBY ORDERED, pursuant to Section 13304 of the California Water Code, that the dischargers, or their successors and assignees, shall cleanup and abate the effects described in SCR Order Nos. 91-020, 92-132, and 93-018 and in the above findings of this Order as follows:

A. Provisions

1. The dischargers shall comply with all requirements of SCR Order Nos. 91-020, 92-132, and 93-018, except as amended by this Order, and shall cleanup pollution in accordance with the cleanup levels as described in Findings 12, 14, 15, 16, 17, and 23 of this Order. The dischargers are responsible for arranging cleanup agreements between them.
2. The Board finds the dischargers' proposal for final cleanup actions for VOCs in groundwater, as set forth in the Supplemental Evaluation, to be protective of human

health and the environment. Cleanup levels for VOC source areas in soil are found to be protective of potential and beneficial uses of groundwater and prevent further degradation of groundwater quality. The Board therefore accepts the dischargers' proposal for final cleanup actions with certain changes and additions, detailed as follows:

- a. The dischargers shall perform quarterly monitoring and reporting for two years after this Order is adopted with reduced frequency thereafter, if warranted. The dischargers may request and the Executive Officer may approve reductions of monitoring and reporting sooner than two years with submittal of satisfactory evidence of a stable pollution containment system.
- b. The dischargers shall submit a contingency plan that commits to the implementation of corrective action if certain criteria are confirmed as exceeded at any compliance point. The contingency plan is considered to be a self-regulating mechanism to assure continuing compliance with the Order.
- c. The dischargers shall be required to contain on-site groundwater polluted with VOCs in concentrations at or above appropriate MCLs to assure maintenance of beneficial uses off-Site.
- d. The dischargers shall, as part of the contingency plan, maintain expansion capacity at the adjacent 328 West Brokaw Road site sufficient for treatment of VOCs at the Site, or a substitute acceptable to the Executive Officer, if such treatment or substitute becomes necessary in the future.
- e. The dischargers shall cause to be recorded with the proper county office appropriate restrictions concerning the use of groundwater in the A-level aquifer in a form acceptable to the Executive Officer.

#### **TASK AND COMPLETION DATE**

The following is added as Provision C.1.e. of SCR Order No. 91-020:

##### **e. TASK: CONTINGENCY PLAN**

The dischargers shall submit a technical report acceptable to the Executive Officer that proposes a contingency plan for implementation of an extraction and treatment system for VOCs detected in groundwater OU-2. The report shall define under what conditions groundwater extraction shall be initiated to establish hydraulic control of OU-2 groundwater to prevent violation of the requirements of this Order. This report shall include but not be limited to:

- 1) Determination of the number and location of guard and compliance wells;
- 2) Evaluation of the performance of the monitoring network, the need to investigate preferential pathways for groundwater and pollutant

migration, and the need to and benefits of installing additional monitoring wells; and,

- 3) Determination whether a threat of off-site migration of polluted groundwater (one or more dissolved VOC pollutants at concentrations equal to or exceeding MCLs) exists; and,
- 4) Recommendations for action to address any potential threat of off-site pollution migration, or to augment on-site surveillance activities, with an implementation schedule.

COMPLETION DATE: No later than September 1, 1994.

**TASK AND COMPLETION DATE**

The following is added as Provision C.1.f. of SCR Order No. 91-020:

f. TASK: DEED NOTICE

The dischargers shall submit a technical report acceptable to the Executive Officer which consists of a deed notice stating appropriate use restrictions for groundwater in the A-level aquifer at the Site.

COMPLETION DATE: No later than October 1, 1994

**TASK AND COMPLETION DATE**

The following is added as Provision C.1.g. of SCR Order No. 91-020:

g. TASK: IMPLEMENT DEED NOTICE

The dischargers shall submit a technical report acceptable to the Executive Officer which documents that the deed notice has been filed with the proper County Office and is in effect.

COMPLETION DATE: No later than December 1, 1994, or within thirty (30) days of receipt of approval from the Executive Officer of the sufficiency of the deed notice submitted under Task C.1.c, whichever is later.

### **TASK AND COMPLETION DATE**

Provision C.1.c. of SCR Order 91-020 is redesignated C.1.h. and is revised as follows:

h. **TASK: COMPLETE IMPLEMENTATION OF FINAL CLEANUP ACTIONS**

The dischargers shall submit a technical report acceptable to the Executive Officer documenting the implementation of final cleanup actions in accordance with Provision A.1..

COMPLETION DATE: 120 days after completion of the actions as proposed and accepted by the Board in accordance with Provision A.1. of this Order.

### **TASK AND COMPLETION DATE**

Provision C.1.d. of SCR Order No. 91-020 is redesignated Provision C.1.i. and is revised as follows:

i. **TASK: SUBMIT FIVE YEAR STATUS REPORT**

The dischargers shall submit a technical report acceptable to the Executive Officer containing the following:

- 1) The results of any additional investigative work completed;
- 2) An evaluation of the effectiveness of installed final cleanup measures, including any groundwater extraction and treatment system installed in accordance with Provisions C.1.e. and C.1.f., above;
- 3) Additional measures to achieve final cleanup standards, if necessary;
- 4) A comparison of previously estimated costs with actual costs incurred and a revised projection of costs necessary to achieve final cleanup standards;
- 5) The tasks and time schedule necessary to implement any additional final cleanup measures;
- 6) Recommended measures for reducing Board oversight activities;
- 7) A description of the reuse of extracted groundwater, if any; and

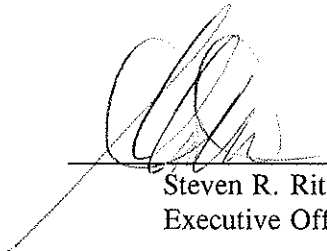
- 8) An evaluation of the removal and/or cleanup of polluted soils, and groundwater.
- 9) If final cleanup standards have not been achieved through the implementation of the approved groundwater and soil remediation plans, this report shall also contain an evaluation addressing whether it is technically feasible to achieve these standards with the approved remedial measures, and if not, contain a proposal for procedures to do so.

COMPLETION DATE: January 1, 1999

B. This Order amends SCR Order Nos. 91-020, 92-132, and 93-018.

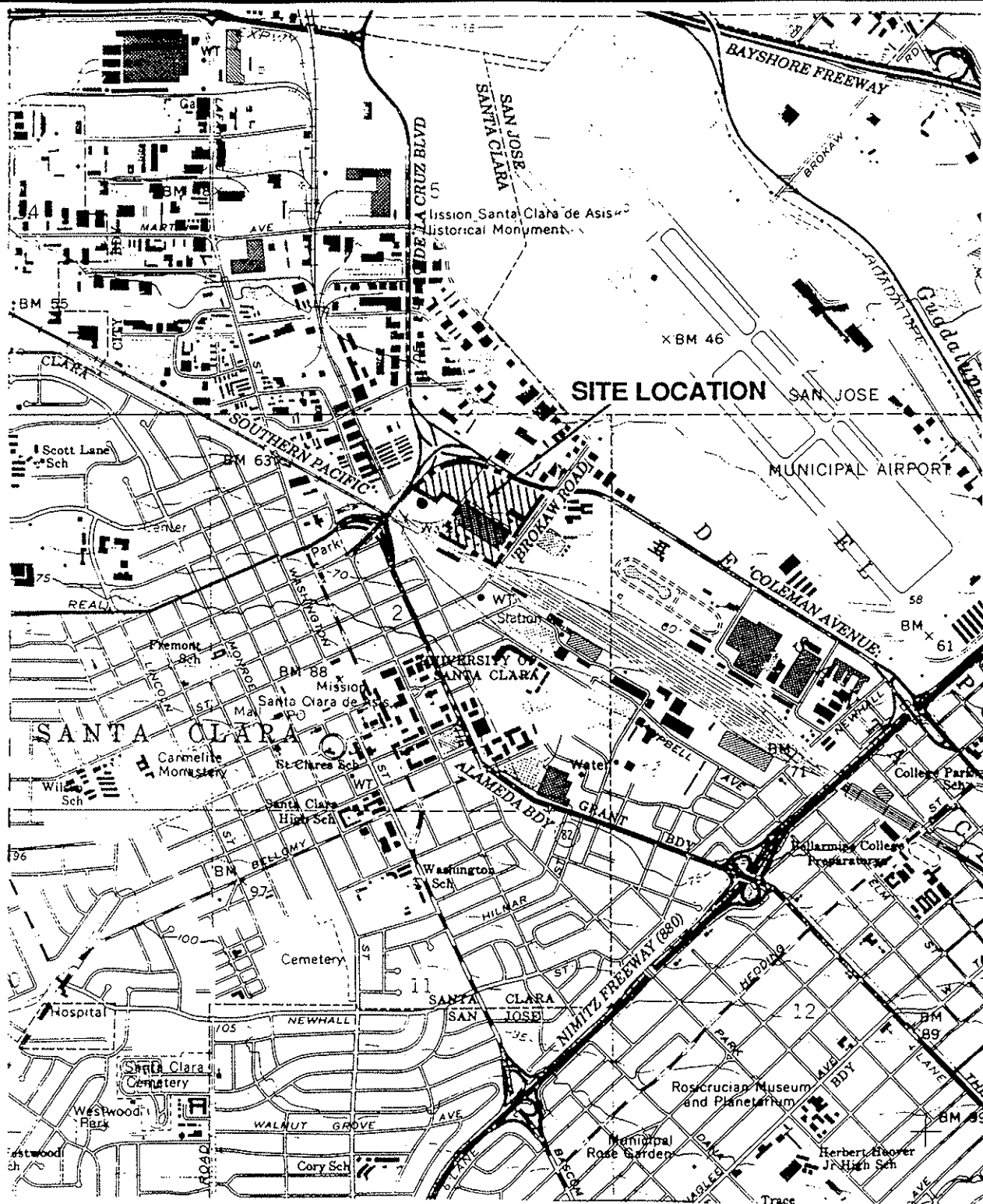
C. The Board will review this Order periodically and may revise the requirements as necessary.

I, Steven R. Ritchie, Executive Officer, do hereby certify that the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region on March 16, 1994.

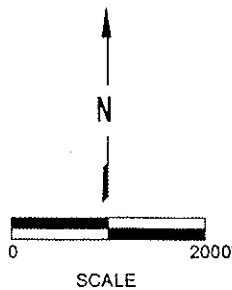


Steven R. Ritchie  
Executive Officer

Figure 1	Site Location
Figure 2	Site Plan
Figure 3	Soil Pollution Areas
Figure 4	Groundwater Pollution Areas



TAKEN FROM USGS 7.5' SAN JOSE WEST QUADRANGLE, 1980



**FMC**

FMC Corporation  
Ground Systems Division  
1125 Coleman Avenue  
San Jose, California 95110

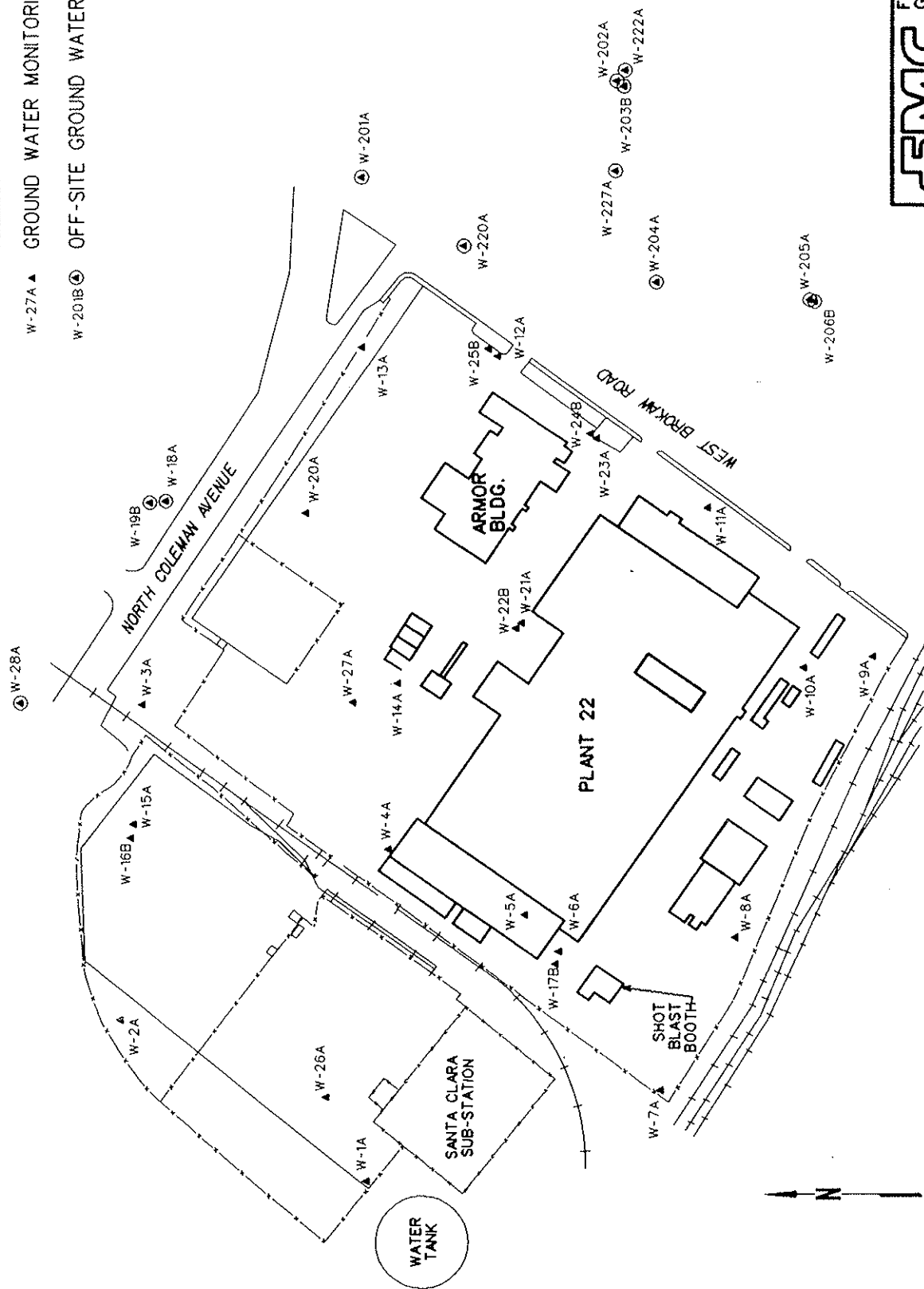
SITE LOCATION MAP  
333 WEST BROKAW ROAD

JANUARY 1994

FIGURE 1

W-27A ▲ GROUND WATER MONITORING WELL

NEW-2018-04 OFF-SITE GROUND WATER MONITORING WELL



**FMC**  
FMC Corporation  
Ground Systems Division  
1125 Coleman Avenue  
San Jose, California 95110

# MONITORING WELL LOCATIONS

JANUARY, 1994

FIGURE 2

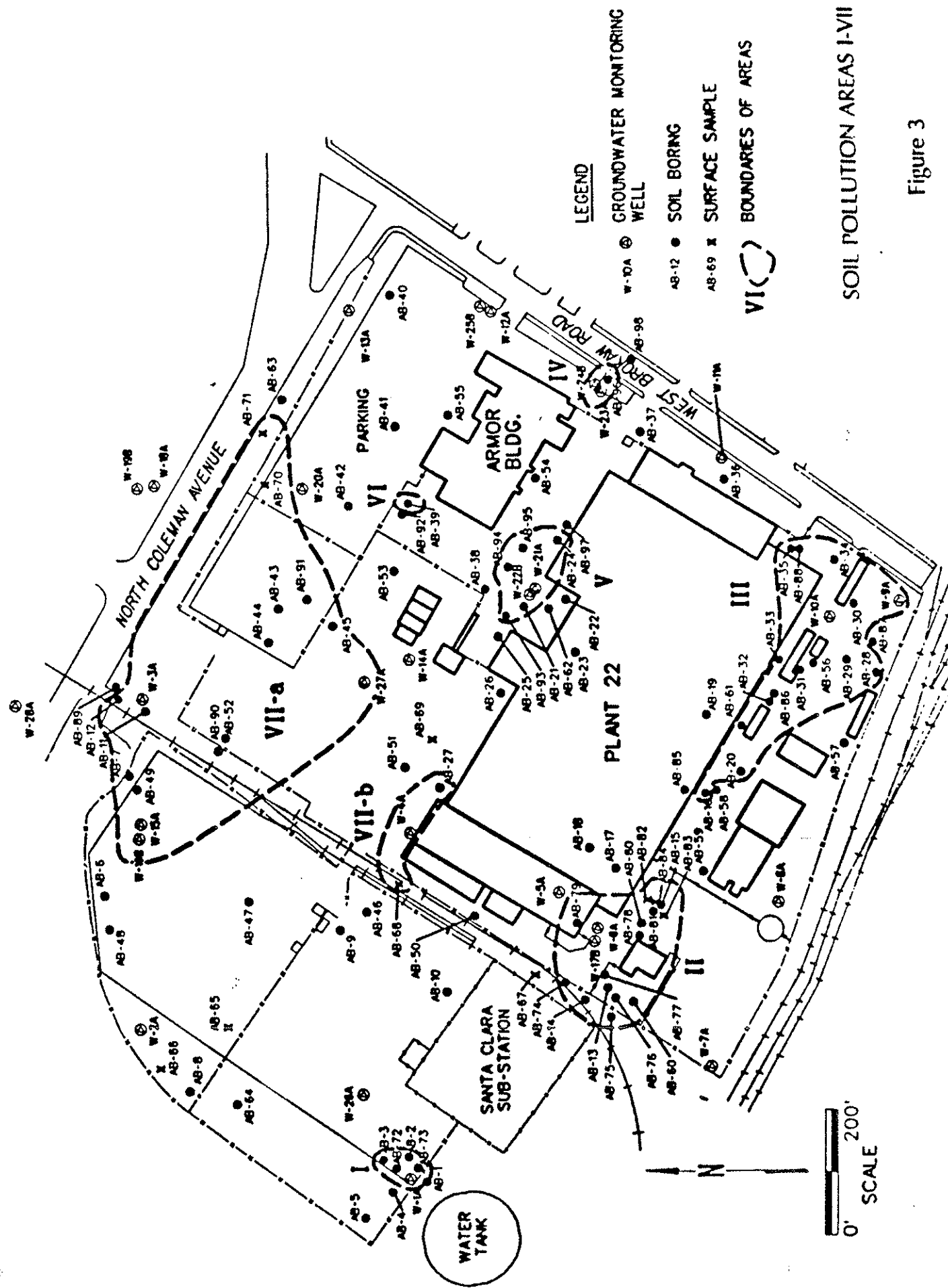
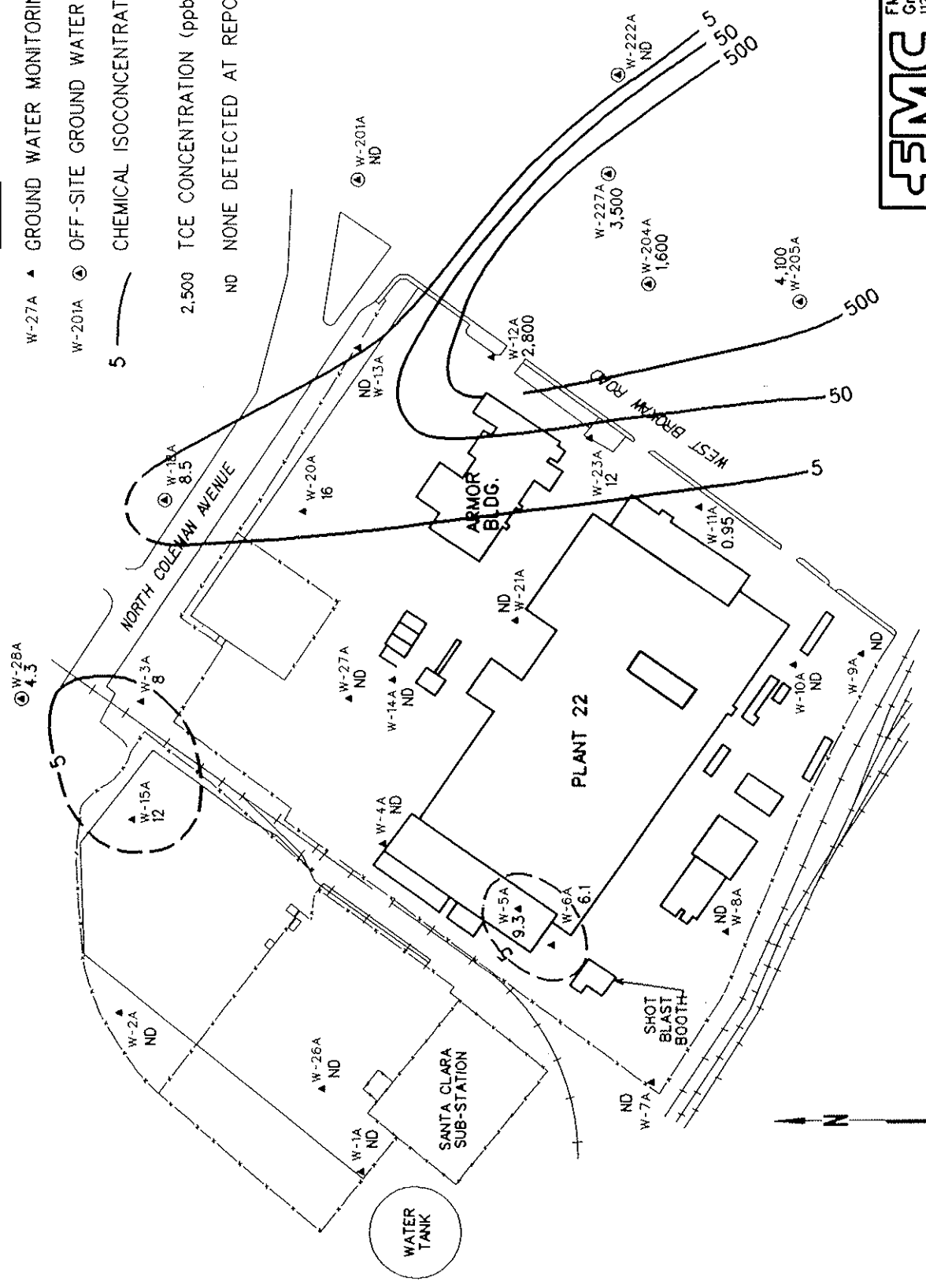


Figure 3

**LEGEND**

- W-27A ▲ GROUND WATER MONITORING WELL
- W-201A ● OFF-SITE GROUND WATER MONITORING WELL
- 5 — CHEMICAL ISOCONCENTRATION CONTOUR
- 2,500 TCE CONCENTRATION (ppb)
- ND NONE DETECTED AT REPORTING LIMIT



<b>FMC</b> FMC Corporation Ground Systems Division 1125 Coleman Avenue San Jose, California 95110	
A-LEVEL AQUIFER TCE CONCENTRATION CONTOURS NOVEMBER, 1993	
JANUARY, 1994	FIGURE 4

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN FRANCISCO BAY REGION

SELF-MONITORING PROGRAM

FOR

FMC CORPORATION

AND

FEDERAL PACIFIC ELECTRIC COMPANY

FOR THE PROPERTY LOCATED AT 333 WEST BROKAW ROAD

SANTA CLARA, SANTA CLARA COUNTY

SITE CLEANUP REQUIREMENTS

ORDER NO. 94-043

CONSISTS OF

PART A

AND

PART B

## PART A

### A. General

1. Reporting responsibilities of waste Dischargers are specified in Sections 13225(a), 13267(b), 13383, and 13387(b) of the California Water Code and this Regional Board's Resolution No.73-16.
2. The principal purposes of a self-monitoring program by a waste Discharger are the following:
  - a. To document compliance with Site Cleanup Requirements and prohibitions established by the Board;
  - b. To facilitate self-policing by the waste Discharger in the prevention and abatement of pollution arising from waste discharge;
  - c. To develop or assist in the development of standards of performance, toxicity standards and other standards; and,
  - d. To prepare water and wastewater quality inventories.

### B. Sampling And Analytical Methods

1. Sample collection, storage, and analyses shall be performed according to the most recent version of Standard Methods for the Analysis of Wastewater, and Test Methods for Evaluating Solid Waste EPA Document SW-846, or other EPA approved methods and in accordance with an approved sampling and analysis plan.
2. Water and waste analysis (except total suspended solids) shall be performed by a laboratory approved for these analyses by the State Department of Health. The director of the laboratory whose name appears on the certification shall supervise all analytical work in his/her laboratory and shall sign all reports of such work submitted to the Regional Board.
3. All monitoring instruments and equipment shall be properly calibrated and maintained to ensure accuracy of measurements.

### C. Definition Of Terms

1. A grab sample is a discrete sample collected at any time.
2. Duly authorized representative may be either a named individual or any individual occupying a named position such as the following:
  - a. Authorization is made in writing by a principal executive officer; or,

- b. Authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as general partner in a partnership, sole proprietor in a sole proprietorship, the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company.

D. Schedule Of Sampling, Analysis, And Observations

The Discharger is required to perform sampling, analysis, and observations according to the schedule specified in Part B.

E. Records To Be Maintained By The Discharger

- 1. Written reports shall be maintained by the Discharger for ground water monitoring and wastewater sampling, and shall be retained for a minimum of three years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge or when requested by the Board. Such records shall show the following for each sample:
  - a. Identity of sample and sample station number;
  - b. Date and time of sampling;
  - c. Date and time that analyses are started and completed, and name of the personnel performing the analyses;
  - d. Complete procedure used, including method of preserving the sample, and the identity and volumes of reagents used. A reference to a specific section of a reference required in Part A Section B is satisfactory;
  - e. Calculation of results;
  - f. Results of analyses, and detection limits for each analyses; and,
  - g. Chain of custody forms for each sample.

F. Reports To Be Filed With The Board

- 1. Ground water monitoring results shall be issued in a quarterly report. Written self-monitoring reports shall be filed no later than 30 calendar days following the end of the report period. In addition an annual report shall be filed as indicated. The reports shall be comprised of the following:
  - a. Letter of Transmittal - A letter transmitting the essential points in each self-monitoring report should accompany each report. Such a letter shall include a discussion of any requirement violations found during the last report period, and actions taken or planned for correcting the violations, such as, operation and/or facilities modifications. If the Discharger has previously submitted a detailed time schedule for correcting requirement violations, a reference to the correspondence transmitting such schedule will be satisfactory. If no violations have occurred in the last report period this shall be stated in the letter of transmittal. Monitoring reports and the letter transmitting the monitoring reports shall be signed by a principal executive officer at the level of vice

president or his duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge originates. The letter shall contain a statement by the official, under penalty of perjury, that to the best of the signer's knowledge the report is true, complete, and correct. The letter shall contain the following certification:

"I certify under penalty of law that this document and all attachments are prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

- b. Each monitoring report shall include a compliance evaluation summary sheet. Until the Order's amended to specify ground water protection standards, the following shall apply and the compliance sheet shall contain:
  - i. The method and time of water level measurement, the type of pump used for purging, pump placement in the well, method of purging, pumping rate, equipment and methods used to monitor field pH, temperature, and conductivity during purging, calibration of the field equipment, results of the pH, temperature conductivity and turbidity testing, well recovery time, and method of disposing of the purge water; and,
  - ii. Type of pump used, pump placement for sampling, a detailed description of the sampling procedure; number and description of equipment, field and travel blanks; number and description of duplicate samples; type of sample containers and preservatives used, the date and time of sampling, the name and qualifications of the person actually taking the samples, and any other observations; the chain of custody record.
- c. A summary of the status of any remediation work performed during the reporting period. This shall be a brief and concise summary of the work initiated and completed as follows:
  - i. As interim corrective action measures; and,
  - ii. To define the extent and rate of migrations of waste constituents in the soil and ground water at the site.
- d. The Discharger shall describe, in the annual report, the reasons for significant increases in a pollutant concentration at a well on-site. The description shall include the following:
  - i. The source of the increase;

- ii. How the Discharger determined or will investigate the source of the increase; and,
    - iii. What source removal measures have been completed or will be proposed.
  - e. A map or aerial photograph showing observation and monitoring station locations, and plume contours for each chemical in each aquifer shall be included as part of the quarterly Self-Monitoring Report.
  - f. Laboratory statements of results of analyses specified in Part B must be included in each report. The director of the laboratory whose name appears on the laboratory certification shall supervise all analytical work in his/her laboratory and shall sign all reports of such work submitted to the Board. The following information shall be provided:
    - i. The methods of analyses and detection limits must be appropriate for the expected concentrations. Specific methods of analyses must be identified. If methods other than EPA approved methods or Standard Methods are used, the exact methodology must be submitted for review; and,
    - ii. In addition to the results of the analyses, laboratory quality control/quality assurance (QA/QC) information must be included in the monitoring report. The laboratory QA/QC information should include the method, equipment and analytical detection limits; the recovery rates; an explanation for any recovery rate that is less than 80%; the results of equipment and method blanks; the results of spiked and surrogate samples; the frequency of quality control analysis; and the name and qualifications of the person(s) performing the analyses.
  - g. By January 31 of each year the Discharger shall submit an annual report to the Board covering the previous calendar year. This report shall contain:
    - i. Tabular and graphical summaries of the monitoring data obtained during the previous year;
    - ii. A comprehensive discussion of the compliance record, and the corrective actions taken or planned which may be needed to bring the Discharger into full compliance with the Site Cleanup Requirements; and,
    - iii. A written summary of the ground water analyses indicating any change in the quality of the ground water.
- G. In the event the Discharger violates or threatens to violate the conditions of the Site Cleanup Requirements and prohibitions or intends to experience a plant bypass or treatment unit bypass due to:
- 1. Maintenance work, power failures, or breakdown of waste treatment equipment, or;
  - 2. Accidents caused by human error or negligence, or;
  - 3. Other causes, such as acts of nature.

The Discharger shall notify the Regional Board office by telephone as soon as he or his agents have knowledge of the incident and confirm this notification in writing within 7 working days of the telephone notification. The written report shall include time and date, duration and estimated volume of waste bypassed, method used in estimating volume and person notified of the incident. The report shall include pertinent information explaining reasons for the noncompliance and shall indicate what steps were taken to prevent the problem from recurring.

In addition, the waste Discharger shall promptly accelerate his monitoring program to analyze the discharge at least once every day. Such daily analyses shall continue until such time as the effluent limits have been attained, until bypassing stops or until such time as the Executive Officer determines to be appropriate. The results of such monitoring shall be included in the regular Self-Monitoring Report.

## Part B

### A. Description Of Observation Stations And Schedule Of Observations

1. The location of the compliance observation stations will be selected by the Dischargers so that the MCLs will not be exceeded at the compliance observation stations. The location of the guard observation stations will be selected by the Dischargers so that treatment will be triggered to prevent the MCLs from being exceeded at the compliance observation stations.
2. The schedule of well observations and grab sampling shall be conducted quarterly anytime during the months of January to March, April to June, July to September and October to December.

### B. Observations and Test Procedures

1. Excavate soils until samples taken for polychlorinated biphenyls (PCBs) in the bottom and sides of the excavation are below the levels established by the Order. Use EPA method 8080.
2. The groundwater well observations for all wells shall consist of the following:
  - a. Water elevation reported to the nearest 0.01 foot for both depth to water from the ground surface and the elevation of the groundwater level;
  - b. Groundwater temperature measured at the time of sampling and reported in degrees Fahrenheit;
  - c. Groundwater conductivity measured at the time of sampling as per Standard Method 2510 using alternating current signal methodology; and,
  - d. Groundwater pH measured at the time of sampling as per Standard Method 4500-H<sup>+</sup> using electrometric methodology; and,
  - e. Groundwater turbidity measured at the time of sampling.
3. The test procedures for the soil and groundwater samples taken from all wells shall be as described herein.
  - a. Volatile organic compounds by EPA Method 8010.
  - b. Detection limits shall be adequate for determining compliance with cleanup standards.
  - c. Evaluation and response shall be in the manner described in 40 CFR Part 265, Sub Part F - Groundwater Monitoring, Section 265.93 and as modified herein:

- i. Collect soil samples from the bottom of each excavation for the removal of TPH (mineral oil) and conduct the standard EPA Toxicity Characteristic Leaching Procedure (TCLP) test with acid extractant. Also use EPA Method 8015M modified test for high boiling point hydrocarbons, total extractable petroleum hydrocarbons so that the 8,000 ppm of TPH is not exceeded in the bottom and sides of an excavation for the removal of TPH.
- ii. Collect water samples from the guard wells for each of the specified parameters, which are TCE, trans-1,2-DCE, cis-1,2-DCE, 1,1-DCA, and 1,1,1-TCA and vinyl chloride. The dischargers must calculate the arithmetic mean and variance, based on at least 4 (four) replicate measurements from each well, and compare results to the criteria in Specification 5 of adopted Order. At least 4 replicate measurements means the results of the required sample analysis for the current calendar quarter and the results of the required sample analysis from each of the three consecutive preceding calendar quarters. The comparison must consider individually each of the wells in the observation system, and must use the single-tailed Student's t-test at the 0.01 level of significance to determine statistically significant increases over the criteria.
- iii. If the comparison for any well shows an increase over the specified criteria for that well, the dischargers must immediately obtain additional groundwater sample(s) from each well where an increase was detected, split the sample(s) in two and obtain analyses of all additional samples to determine if the increase was a result of human error.
- iv. If the analyses confirm increase(s), the dischargers must provide verbal notice within 72 hours and written notice within 7 days of the date of such confirmation, to the Regional Board.
- v. Within 15 days after receiving written notification from the Board, the dischargers must implement a contingency plan and within 90 days following notification must begin groundwater extraction; implementation and extraction will continue until confirmed groundwater analyses indicate a return to pre-existing conditions. Groundwater monitoring/sampling and analyses will be accelerated according to a plan proposed to and approved by the Board Executive Officer within 30 days after written notification first received by the dischargers.
- vi. If concentrations of one or more VOCs above MCLs migrate off-site, this will be considered a violation and subject to enforcement action.

I, Steven R. Ritchie, Executive Officer, hereby certify that the foregoing Self-Monitoring Program is as follows:

1. Developed in accordance with the procedures set forth in this Board's Resolution No. 73-16;
2. Effective on the date shown below; and,

3. May be reviewed or modified at any time subsequent to the effective date, upon written notice from the Executive Officer, or request from the Discharger.



Steven R. Ritchie  
Executive Officer

3/16/94  
Date Ordered